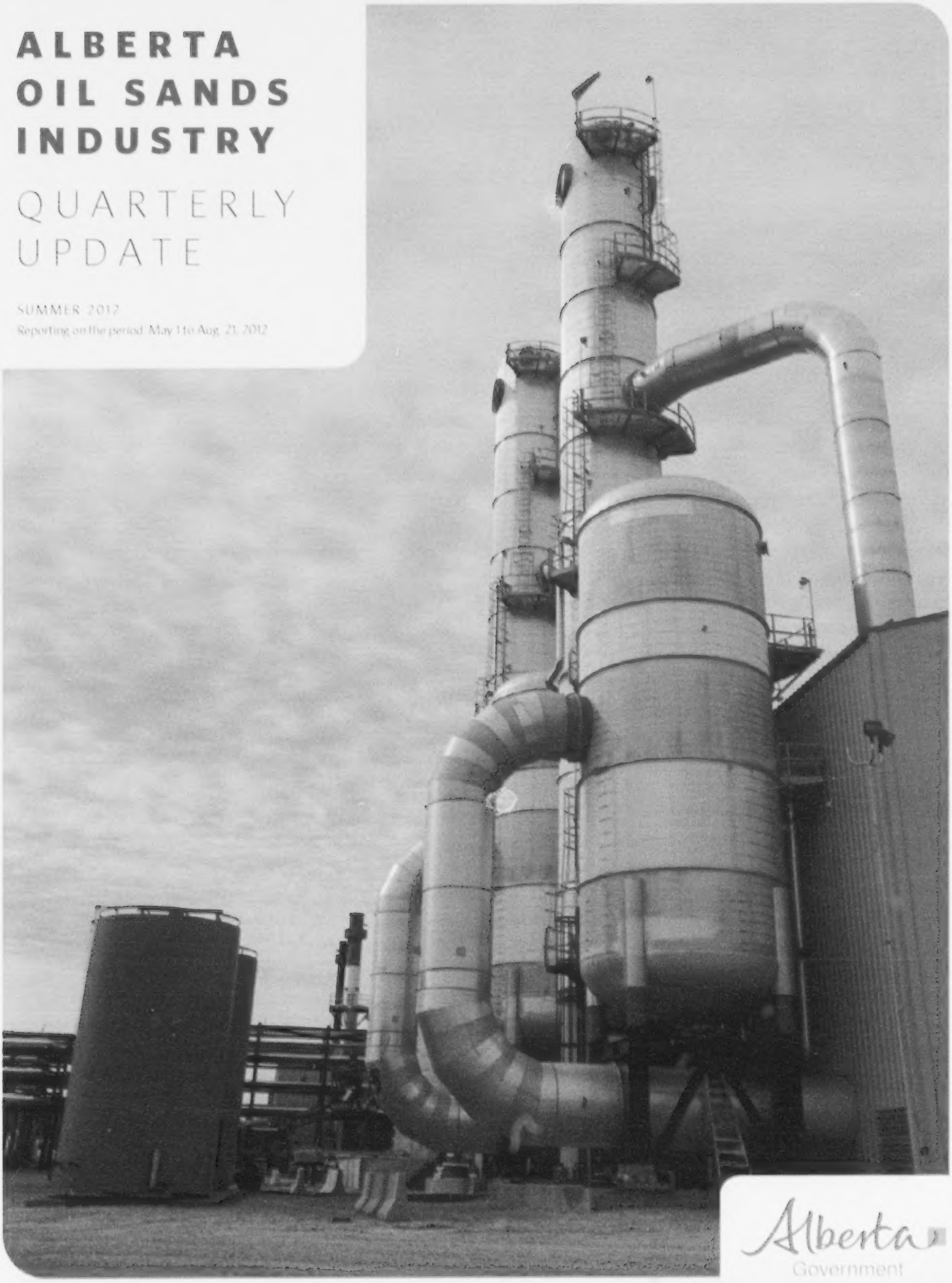
ALBERTA OIL SANDS INDUSTRY

QUARTERLY UPDATE

SUMMER 2012

Reporting on the period: May 1 to Aug. 21, 2012



Alberta Government

All about the oil sands

Background of an important global resource

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Canada has the third-largest oil reserves in the world, after Saudi Arabia and Venezuela. Of Canada's 174 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and about 169 billion barrels are recoverable from bitumen. This is a resource that has been developed for decades but is now gaining increased global attention as conventional supplies—so-called "easy" oil—continue to be depleted. The figure of 169 billion barrels of bitumen represents what is considered economically recoverable with today's technology, but with new technologies, this reserve estimate could be significantly increased. In fact, total oil sands reserves in place are estimated at 1.8 trillion barrels.

There are three major bitumen (or oil sands) deposits in Alberta. The largest is the Athabasca deposit, which is located in the province's northeast in the Regional Municipality of Wood Buffalo. The main population centre of the Athabasca deposit is Fort McMurray. The second-largest oil sands deposit is referred to as Cold Lake, just south of Athabasca, with the main population centre the City of Cold Lake. The smallest oil sands deposit is known as Peace River, which is located in northwest-central Alberta. A fourth deposit called Wabasca links to the Athabasca and is generally lumped in with that area.

The existence of bitumen in Alberta has been known for a long time. The first mention of it in Canadian history was in 1719, when a Cree named Wapasu brought a sample of the "gum" to a Hudson's Bay trading post. First Nations in what is now the Wood Buffalo area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

Today, bitumen is produced as an energy source by two means—mining and in situ. In 2011, 51 per cent of oil sands production came from mines, but by 2015, in situ bitumen production is expected to surpass mined bitumen production. Alberta will need to rely to a greater extent on in situ production in the future, as 80 per cent of the province's proven bitumen reserves are too deep underground to recover using mining methods.

There are essentially two commercial methods of in situ (Latin for "in place," essentially meaning wells are used rather than trucks and shovels). In cyclic steam stimulation (CSS), high-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.

In steam assisted gravity drainage (SAGD), parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near its bottom. Steam is injected into the top well, a steam chamber forms, and the melted bitumen flows into the lower well via gravity and is pumped to the surface using artificial lift.

Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The selection is based on a number of factors, including geology. The technologies combined currently produce just over one million barrels per day.

Research is underway on a number of other production technologies designed to optimize production, including variations on solvent-assisted SAGD and CSS, recovery using electricity, and in situ combustion.

Bitumen that has not been processed, or "upgraded," can be used directly as asphalt. It must be diluted to travel by pipeline. Adding value, some producers upgrade their product into synthetic crude oil, which is a refinery feedstock. That can be transformed into transportation fuels and other products. ■

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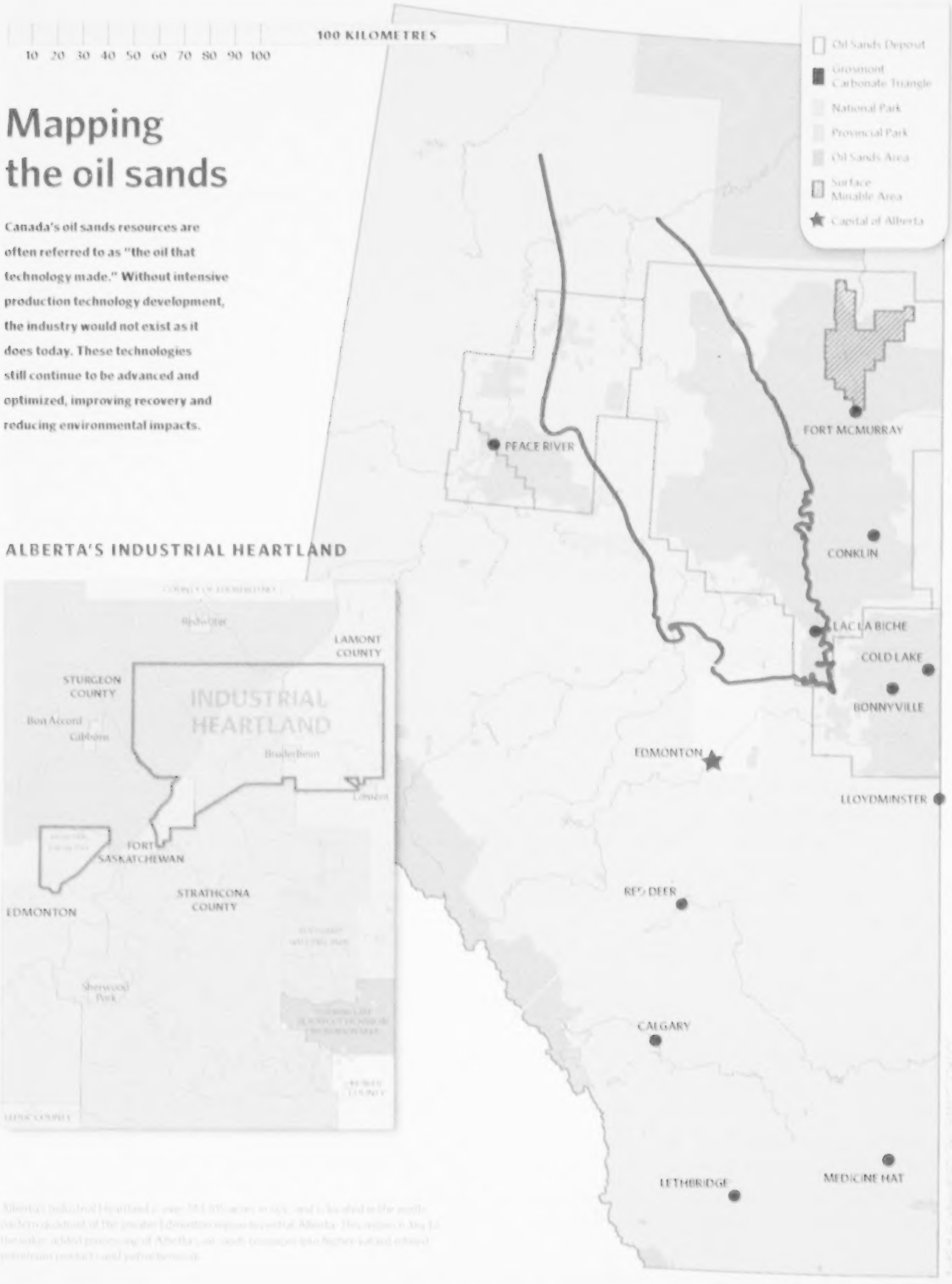

Mapping the oil sands

Canada's oil sands resources are often referred to as "the oil that technology made." Without intensive production technology development, the industry would not exist as it does today. These technologies still continue to be advanced and optimized, improving recovery and reducing environmental impacts.

Alberta's Industrial Heartland is over 30,000 acres in size, and is located in the north-eastern quadrant of the greater Edmonton region in central Alberta. This region is key to the value-added processing of Alberta's oil sands resources into higher value refined petroleum products and petrochemicals.

Government update

ERCB REPORTS SHOW SEVEN PER CENT GROWTH IN CONVENTIONAL CRUDE OIL PRODUCTION AND REVISED IN-PLACE ESTIMATES OF FOUR BITUMEN DEPOSITS

The Energy Resources Conservation Board (ERCB) has released *Alberta's Energy Reserves 2011 and Supply/Demand Outlook 2012–2021*, which outlines the state of reserves and the supply and demand outlook for Alberta's diverse energy resources: crude bitumen, crude oil, natural gas, natural gas liquids, coal and sulphur.

In 2011, Alberta's conventional crude oil production totalled 77.9 thousand cubic metres (m³) (490 thousand barrels) of oil per day with a yearly total of 28.4 million m³ (179 million barrels). This is a seven per cent increase from 2010, the first rise in production since 1995, due to the higher production rates from horizontal wells.

The Athabasca Upper, Middle and Lower Grand Rapids deposits and the Athabasca Nisku oil sands deposit were reassessed for year-end 2011. The review of the three Grand Rapids deposits resulted in a seven per cent increase of the total in-place crude bitumen resource to 9.3 billion m³ (58.4 billion barrels), which is attributed to an increased number of wells drilled in the area. The reassessment of the Nisku deposit resulted in a 17 per cent increase of the in-place resource to 1.7 billion m³ (10.7 billion barrels), which is attributed to an increase in average thickness and an expansion of the delineated resource area.

In 2011, Alberta produced 227 thousand m³ (1.2 million barrels) per day of raw crude bitumen from the oil sands, for a yearly total of 101 million m³ (632 million barrels), or an eight per cent increase over Alberta's 2010 oil sands production.

The ERCB forecasts Alberta's annual raw crude bitumen production will total 587.3 thousand m³ (3.7 million barrels) per day for a total of 214 million m³ (1.35 billion barrels) per year by 2021.

The report notes that, since 1967, Alberta has produced about 1.3 billion m³ (8.1 billion barrels) of raw crude bitumen from the oil sands and has produced about 2.6 billion m³ (16.5 billion barrels) of crude oil since 1914.

Other report highlights include:

- Alberta's total remaining established crude bitumen and crude oil reserves totalled 2.0 billion m³ (13.0.2 billion barrels), consisting of 26.8 billion m³ (168.6 billion barrels) of crude bitumen and 24.59 million m³ (1.5 billion barrels) of crude oil.
- Remaining established crude oil reserves increased by a net four per cent, similar to the increase last year, as the cumulative result of reserves additions from 2011 drilling, reserve revisions and production.
- Remaining established marketable conventional gas reserves stood at 94.5 billion m³ (3.3.5 trillion cubic feet), a decrease of eight per cent from 2010.
- Remaining established reserves of natural gas liquids stood at 25.15 million m³ (1.6 billion barrels), down three per cent from 2010.
- Alberta's remaining established coal reserves are down very slightly and stand at 33 billion tonnes (37 billion tons).

NEW WEST PARTNERSHIP STREAMLINES BUSINESS REGISTRATION ACROSS THE WEST

The New West Partnership Trade Agreement is a far reaching economic partnership between the provinces of Alberta, British Columbia and Saskatchewan, designed to foster prosperity for the region and for our people through meaningful interprovincial collaboration. Under the agreement, businesses registering as a corporation will no longer need to register separately in each of the three jurisdictions as extra-provincial registration will be facilitated by the home province.

Businesses across western Canada will find it easier to operate throughout the region under New West Partnership rules that took effect July 1.

Corporations will be asked to provide additional information to their home province to have their extra-provincial registration take effect in the remaining jurisdictions. No additional fees will be required for extra-provincial registration in the two other provinces. The partnership removes the need for corporations to file their annual filing requirement in all three provinces. Instead, corporations will now be able to file once in their home province.

Reducing red tape and creating a more open and competitive marketplace with British Columbia and Saskatchewan will help Alberta businesses expand their markets and attract new clients. These actions help secure Alberta's economic prosperity.

For more information, visit the New West Partnership at www.newwestpartnership.ca.

ALBERTA GOVERNMENT FREES UP LAND TO GIVE FORT MCMURRAY MORE ROOM TO GROW

The Alberta government has agreed to the conditional sale of 202 acres of Crown land in the Saline Creek area to the Rotary Club of Fort McMurray to develop a new residential community with housing options ranging from town houses to single family units. The lands adjoin property where the Rotary Club is proposing to develop a public golf course.

The conditional sale is part of the Alberta government's comprehensive strategy for releasing additional Crown land for the timely development of more residential, industrial and commercial lands in Fort McMurray.

Over the next couple of months, both parties will work towards finalizing the agreement so that initial activity can begin on site as soon as possible.

This land sale is an important component of the province's land release strategy and Responsible Actions, Alberta's 20 year strategic plan for the oil sands, which includes efforts to support further planning and development of vibrant communities in the oil sands regions.

ALBERTA WELCOMES OIL SANDS ALLIANCE ON ENVIRONMENTAL ISSUES

Alberta Environment and Sustainable Resource Development Minister Diana McQueen issued the following statement in response to the announcement of Canada's Oil Sands Innovation Alliance (COSIA), a consortium of industry members dedicated to environmental performance in the oil sands.

"Alberta's oil sands is a key resource to meet a growing global energy demand. It's crucial that this development take place in an environmentally responsible manner.

"I am pleased to see industry come together to form Canada's Oil Sands Innovation Alliance, working together to share expertise and experience to generate innovative solutions to the challenges faced by the entire sector. This collaboration will help us all find solutions to the issues we are dealing with today, as well as those we may encounter down the road. I'm happy the group's initial focus will be on four key environmental priority areas – tailings, water, land and greenhouse gases.

"The alliance is encouraging integration by building on the good work already underway by experts in the oil sands industry and those in research and development sectors.

"Alberta's strong network of researchers, engineers and scientists are continually breaking through with new technologies to improve environmental performance in the oil sands, just as their expertise unlocked the resource in the first place. The establishment of COSIA represents an understanding of shared responsibility. We look forward to working with the alliance to pool our expertise and knowledge with that of other stakeholders as we continue to deliver environmental excellence."

EARLY IMPROVEMENTS IN PLACE FOR OIL SANDS MONITORING PROGRAM

In July, Canada's Environment Minister Peter Kent and Alberta's Environment and Sustainable Resource Development Minister Diana McQueen toured several of the new oil sands monitoring stations now in place in the early stages of implementation of the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring.

The Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring, announced by Minister Kent and Minister McQueen in February, commits to a scientifically rigorous, comprehensive, integrated and transparent environmental monitoring program for the region. It outlines the path forward to enhance the monitoring of water, air, land and biodiversity in the oil sands by demonstrating how we will sample more sites for more substances more frequently. The program is designed to provide an improved understanding of the long-term cumulative effects of oil sands development.

Both ministers were pleased with the progress they saw, noting that the monitoring enhancements for the first year of the joint plan are well underway, that the joint approach is working well and that initial results from the new enhanced monitoring are expected this year. Implementation will continue to be phased in over three years to ensure installation of necessary infrastructure, incremental enhancement of activities and appropriate integration with existing monitoring activities in the region.

The joint plan strengthens environmental monitoring programs for air, water, land and biodiversity in the oil sands region. It will result in improved knowledge of the state of the environment in the oil sands area and an enhanced understanding of cumulative effects and environmental change, including future impacts arising from multiple stressors, which will become more important to understand as development continues.

By the time the three-year plan is fully implemented in 2015, there will be more sampling sites over a larger area. The number and types of parameters being measured will increase, the frequency of sampling will increase and an integrated, open data management plan will be created. Under the plan, the governments of Alberta and Canada will work together over the next three years as partners to implement a world-class monitoring program for the oil sands that integrates all environmental components – air quality, water quality, water quantity, aquatic ecosystems, terrestrial biodiversity and wildlife habitats.

SHELL QUEST CCS PROJECT APPROVED WITH CONDITIONS

The Energy Resources Conservation Board (ERCB) has issued Decision 2012 ABERCB 016 which includes conditions, for Shell Canada Limited's application for a carbon capture and storage project north of Edmonton.

The hearing panel determined it is in the public interest to proceed with the project, finding the proposed reservoir is a suitable location for the long-term storage of CO_2, and the combination of geological conditions, engineering design, operational practices and extensive monitoring program mitigate any potential risks the project might pose.

The ERCB held a hearing in Redwater, Alta., from March 6–9, 2012, to consider the applications and any concerns from interveners. ERCB hearings are formal, quasi-judicial proceedings during which evidence is given, and cross-examination and argument take place.

Prior to issuing its final approval, the ERCB is required to refer the application to Alberta Environment and Sustainable Resource Development for review. Alberta Environment and Sustainable Resource Development may impose additional conditions with respect to the environment, which will be added to the ERCB's approval.

PREMIER REDFORD ADDRESSES GOVERNMENT OF BRITISH COLUMBIA'S REQUIREMENTS FOR NORTHERN GATEWAY PIPELINE

Premier Alison Redford issued the following statement following the Government of British Columbia's announcement regarding the proposed Northern Gateway Pipeline:

"Alberta is committed to building our country and cementing Canada's position as a global energy superpower. Leadership is about working together, and that's when our country benefits from our energy economy.

"[Recently,] the Government of British Columbia released a list of requirements to be met to satisfy their concerns about the perceived environmental risks associated with the Northern Gateway Pipeline. Every Canadian, no matter what province they call home, expects that energy development is done with a high degree of environmental safeguards. This is why a rigorous environmental review is underway by the National Energy Board. It is why the company involved has committed an additional $500 million for increased monitoring and safety measures. These efforts, combined with the fact that pipelines are still by far the safest means by which to transport oil, significantly mitigate the environmental risk and weaken the B.C. government's argument for compensation based on potential risk.

"As Alberta has said repeatedly, and as we saw in the recent report from the senate's Energy, Environment and Natural Resources Committee, accessing new energy markets is a national imperative. It is essential for the economic benefit of Canada.

"Our confederation works as well as it does because of the free flow of goods and products through provinces and territories – including forest products, oil, liquefied natural gas, potash, uranium, grain and manufactured goods.

"We've worked very hard through our New West Partnership to ensure free trade across the B.C./Alberta/Saskatchewan borders and the shared economic rewards have been great for our citizens.

"Leadership is not about dividing Canadians and putting one province against another – leadership is about working together. That's when our country benefits, that's when Canada leads. Through a Canadian energy strategy, the provinces and territories together will reach their full energy potential and contribute to increased prosperity and a higher standard of living for all Canadians."

ENERGY MINISTER COMMENTS ON NEW INVESTMENT ANNOUNCEMENT FROM CNOOC

Alberta's Energy Minister Ken Hughes issued the following statement in response to the offer by China National Offshore Oil Corporation (CNOOC) to purchase Nexen Inc., Canada's 12th largest energy company. Nexen has agreed to a US$15.1 billion takeover by CNOOC, marking the most important acquisition to date by an Asian firm in Canada. Nexen produces approximately 213,000 barrels of oil equivalent per day.

"[This] potential transaction is further evidence of the vital importance of Alberta's oil sands to meet global energy demand.

"Foreign investment benefits Albertans and Canadians, putting Canadian firms in a better position to compete globally. Nexen itself is a Canadian company that maintains operations around the world – including in the Gulf of Mexico, Africa and the North Sea. The investment required to develop oil sands resources is significant. The oil sands have already drawn investment from China, the United States, Norway, Japan, South Korea, France, Thailand and the United Kingdom. The result is jobs for Canadians here and abroad, and competitive products on an international market.

"The offer is subject to approval by the federal government under terms of the Investment Canada Act. Operations in the Alberta oil sands must operate under existing regulatory frameworks, employment standards, safety codes and environmental laws."

What's new in the oil sands

BUSINESS

In what would be by far the biggest Chinese acquisition in the Canadian oilpatch, state-owned China National Offshore Oil Corporation (CNOOC) Limited has agreed to buy Nexen Inc. for US$15.1 billion.

CNOOC has invested $2.8 billion in Canada since 2005 when it bought a 16.7 per cent stake in then-private MEG Energy Corp. for US$122 million. CNOOC is already partnered with Nexen through its 35 per cent stake in the Long Lake steam assisted gravity drainage (SAGD) and upgrader project acquired through last year's $2.1 billion purchase of OPTI Canada Inc.

The Nexen deal – which has been approved by both companies' boards of directors – is also subject to shareholder and regulatory approval. If successful, the deal would be China's biggest foreign takeover.

Canadian Natural Resources Limited has submitted regulatory applications for its proposed 50,000-barrel-per-day, $15.3-billion Grouse in situ oil sands project.

Receipt of regulatory approvals in the second quarter of 2014 would allow the company to begin construction in the first quarter of 2015. Drilling and completion of the first well pairs would commence in third quarter of 2014 and Canadian Natural anticipates first steam in the fourth quarter of 2017. Initial production would occur in the first quarter of 2018.

BlackPearl Resources Inc. has filed a commercial development application with regulators for an 80,000-barrel-per-day steam-assisted gravity drainage (SAGD) project. Blackrod, expected to cost $2.8 billion to build, BlackPearl currently operates a SAGD pilot at Blackrod, which it says has been generating commercial production rates.

The first phase of the proposed 20,000-barrel-per-day commercial project is expected to begin construction in the fourth quarter of 2013, pending regulatory approval. Blackrod targets a relatively new production formation, the Grand Rapids.

Southern Pacific Resource Corp. has announced that steam began circulating through the second pad of six steam-assisted gravity drainage (SAGD) well pairs at the STP-McKay thermal project on July 13. This brings to 12 the total SAGD well pair count currently being steamed at the newly operational project.

Steam will now be circulated through all 12 SAGD wellbores for a period of three to four months, after which bitumen production is scheduled to begin.

About 1,000 people are working on North West Upgrading Inc.'s Alberta upgrader/refinery project, the company reports. About $6.00 million has been spent so far, components with long delivery times have been ordered, and engineering and design activities are underway in preparation for sanction in the third quarter.

Construction of the 50,000-barrel-per-day first phase is expected to take about 36 months. North West and partner Canadian Natural Resources Limited hope to have the plant, in the Industrial Heartland near Edmonton, on stream by mid-2015.

Newspaper publisher David Black is hoping to construct a $13-billion refinery near Kitimat, B.C., which would have the capacity to process all of the output of the planned Enbridge Inc. Northern Gateway pipeline.

The refinery would be designed specifically for processing oil sands heavy crude oil, processing up to 550,000 barrels per day of diluted feedstock. The diluent would be separated and returned to Edmonton via the proposed Enbridge secondary pipeline. It's hoped that construction will begin in 2014 and be finished by 2020.

Técnicas Reunidas Canada reports that it has been awarded a major contract by an oil sands synthetic crude oil producer to provide engineering, procurement and construction services for its upgrader in the Fort McMurray region, valued above $800 million.

The upgrader will process above 300,000 barrels per day of diluted bitumen, and will include a new vacuum unit. Técnicas Reunidas says the project started its engineering phase in the second quarter of 2012. This is the first project for the company in the oil sands sector.

Cenovus Energy Inc. says it has decided to conclude its formal process of looking for a partner for its proposed Telephone Lake oil sands project as it develops what could potentially be another cornerstone asset.

Cenovus says that the process was never financially driven, but rather about looking for something that would bring strategic value, perhaps helping to manage light-heavy differentials. Telephone Lake is expected to start construction in 2014.

Horizon North Logistics Inc. has entered into a contract for the sale of a new 1,900-person dormitory complex to a major operator in the Fort McMurray oil sands region. Total value of the project, which includes design, manufacture, transportation and site installation, is approximately $140 million.

Horizon will begin manufacturing the project in the fourth quarter, with installation scheduled to be complete in early 2014. The majority of the project manufacturing work will take place in Horizon's plant in Kamloops, B.C.

What's new in the oil sands

TECHNOLOGY

Tervita Corporation has entered into an exclusive lease agreement with LTS Energy Canada Ltd. for the first rack and pinion service rig on the continent.

Tervita says the technology is safer and more environmentally friendly than traditional rigs, requiring fewer workers to operate while keeping those employees at a safer distance from the operation. The new rig has the flexibility of being powered by diesel or electricity, and is designed to provide greater automation.

Much work remains and the process is not "a slam dunk," but MEG Energy Corp. says that after achieving a steam-oil ratio of 1.8:1 at the first phase of a pilot at its Christina Lake steam assisted gravity drainage (SAGD) project, the company is now undertaking the engineering design to assess the technology's incorporation in the Phase 2 project area. MEG is piloting injecting non-condensable gas into three SAGD well pairs in the Phase 1 area.

"The techniques we use here are designed to replace steam with recyclable gas in order to maintain pressure in the reservoir," says president and chief executive officer Bill McCaffrey. "To date, the use of non-condensable gas has freed up our steam requirements by about 25 per cent with no drop in production. That steam is now free to be redeployed into pre-drilled wells that provide a very efficient way of adding low-cost barrels."

Syncrude Canada Ltd. owners report that work is progressing on technologies designed to make mining operations compliant with rules surrounding tailings ponds. Two projects, the Aurora North tailings management plant and a centrifuge tailings management project at Mildred Lake, will start this year and take until the end of 2014 to complete. The Aurora North tailings plant will add sand and a small amount of gypsum to tailings so that it coagulates and turns into solid, trafficable material that can be trucked away and used to reclaim land. Syncrude majority partner Canadian Oil Sands Limited plans to spend $300,000 on the project this year. The targeted in-service date is fourth quarter 2014.

Syncrude is also pioneering centrifuge technology that puts bitumen into a tumbler at high speed with a flocculent to separate the solids from water. The pilot is expected to be turned into a commercial project ready for operations in fourth quarter 2014.

Value Creation Inc. is proposing a phased 75,000-barrel per day steam assisted gravity drainage project with output to be converted using the company's patented accelerated decontaminated bitumen processing and primary upgrading technology. The project would be developed in three phases, with construction anticipated to start in May 2014. The first phase will be designed to produce 15,000 barrels per day of bitumen, which will be converted to 12,750 barrels per day of decontaminated crude oil.

Groundwork is expected to begin this fall for the 45,000-barrel-per-day first phase of Cenovus Energy Inc.'s Narrows Lake solvent assisted process (SAP) in situ project in the South Athabasca region. It will be the industry's first use of SAP with butane on a commercial scale, a process designed to thin the oil and allow it to flow more freely to the producing well.

Sanction by Cenovus and partner ConocoPhillips Canada is expected by the end of this year. First production at Narrows Lake is anticipated in 2017.

Niagara, Ont.-based Accipiter Radar Technologies Inc. reports that Syncrude Canada Ltd. recently installed its radar based bird protection system at its oil sands tailings ponds. Accipiter says the technology is the same system that helps keep birds and planes apart at airports, and is the largest and most sophisticated radar-based bird protection system ever deployed.

The system includes several types of deterrent devices, both on land and floating on the ponds, including high-power acoustic hailing devices, propane cannons, strobe lights and animated predator effigies.

Tervita Corporation has announced a new agreement to license and market a new technology designed to treat evaporator blowdown in a more responsible, sustainable and cost-effective way for steam assisted gravity drainage (SAGD) operators. The technology was developed by Veolia Water Solutions & Technologies.

Evaporator blowdown is the remaining waste solution after produced water has been treated. Previously, evaporator blowdown was injected into caverns as waste. The new technology will create two waste streams where there was previously one, providing producers with more environmentally appropriate disposal.

Tervita is currently engineering a pilot plant and expects construction to be complete by April 2013, with plans to move to a SAGD operation later in the year.

OIL SANDS PROJECT TECHNOLOGY GUIDE

CSS—CYCLIC STEAM STIMULATION

CSS involves injecting high pressure steam into the reservoir for several weeks, followed by several weeks where the reservoir is left to "soak." The heat softens the bitumen and the water dilutes and separates the bitumen from the sand. The pressure creates cracks and openings through which the bitumen can flow back into the steam injector wells, which are converted to production mode.

ET-DSP—ELECTRO-THERMAL DYNAMIC STRIPPING

ET-DSP combines the majority of the dominant heat transfer mechanisms to heat and mobilize bitumen in situ. Electrodes are placed in a grid configuration and a production well is located within the center of each series of electrode wells. The technology has been commercially applied for soil remediation and is expected to reduce greenhouse gas emissions and water use.

N-SOLV

N-Solv involves the injection of pure, heated solvent vapour into an oil sands reservoir where it condenses, delivering heat to the reservoir and subsequently dissolving the bitumen, with the resulting miscible liquids flowing by gravity to a production well. It is designed to accelerate extraction rates and reduce greenhouse gas emissions.

SAGD—STEAM ASSISTED GRAVITY DRAINAGE

SAGD employs two parallel horizontal wells, one injection well near the top of the reservoir, through which high pressure steam is continuously injected, and one production well near the bottom of the reservoir into which the softened bitumen continuously flows and can be pumped to the surface. SAGD surface facilities include steam generation, water processing, and bitumen treatment. Multiple operators are also now working with solvent co-injection in SAGD to increase recovery and reduce natural gas and water requirements.

SURFACE MINING

Integrated oil sands mining operations accomplish three main functions: mining the oil sands, separating the bitumen from the sand and upgrading the bitumen so refiners can work with it.

TAGD—THERMAL ASSISTED GRAVITY DRAINAGE

TAGD is a process being developed for the in situ recovery of bitumen from carbonate formations. TAGD uses an array of downhole heaters installed in horizontal wells to heat the reservoir via thermal conduction.

THAI—TOE-TO-HEEL AIR INJECTION

THAI uses a vertical air injection well with a horizontal production well. Rather than steam, THAI technology injects air and then relies on underground combustion of a portion of the oil in the ground to generate the heat required to melt the remainder of the bitumen and allow it to flow into the production well. The process is intended to reduce greenhouse gas emissions and water use.

Project listings

Updated status of oil sands projects in Alberta as at Apr 1, 2012

CURRENT PROJECT	CAPACITY	START UP	REGULATORY STATUS	TECHNOLOGY
NORTH ATHABASCA REGION — MINING				
CANADIAN NATURAL RESOURCES LIMITED				
Horizon				
Canadian Natural says the addition of a third ore preparation plant, commissioned in Q1/2012, is making a significant difference in improving uptime. Its Phase 2A oilsands expansion is tracking to its revised schedule; lump sum contracts have been awarded for key pieces of the Phase 2B expansion, and engineering is on track for Phase 3.				
Phase 1	135,000	2008	Operating	Mining
Phase 2A	80,000	2014	Approved	Mining
Phase 2B	45,000	TBD	Approved	Mining
Phase 3	80,000	TBD	Approved	Mining
Jackpine 2	5,000	2012	Operating	Mining
IMPERIAL OIL LIMITED				
Kearl				
Imperial Oil says that, as of the end of Q2/2012, Kearl Phase 1 is 94 per cent complete, with construction 88 per cent complete. All modules fabricated in Korea and transported through North America have now arrived at site and are being reassembled and integrated into the plant.				
Phase 1	110,000	2012	Construction	Mining
Phase 2	110,000	2015	Construction	Mining
Phase 3 Debottleneck	40,000	2020	Approved	Mining
SHELL ALBIAN SANDS				

CURRENT PROJECT	CAPACITY	START UP	REGULATORY STATUS	TECHNOLOGY
Jackpine				
The joint review panel reviewing the proposed Jackpine mine expansion has extended the period of public comment to August 3.				
Expansion	100,000	2017	Application	Mining
Phase 1A	100,000	2020	Operating	Mining
Phase 1B	100,000	TBD	Approved	Mining
Muskeg River				
Summer 2012 marks the 10th anniversary of the opening of the Athabasca Oil Sands Project.				
Commercial	155,000	2002	Operating	Mining
Expansion & Debottlenecking	115,000	TBD	Approved	Mining
Pierre River				
A joint review panel of the Canadian Environmental Assessment Agency and Energy Resources Conservation Board has been established to review the proposed Pierre River mine project.				
Phase 1	100,000	2018	Application	Mining
Phase 2	100,000	TBD	Application	Mining
SUNCOR ENERGY INC.				
Base Operations				
Suncor says it has its tailings reduction operations (TRO) introduction project and commenced operations. It is also in the process of starting up the hydrotreating unit and hydrogen plant of the new Millennium Naphtha Unit, which is expected to stabilize secondary upgrading capacity and provide flexibility during maintenance activities for secondary upgrading units in the future.				
Millennium Debottlenecking	23,000	2008	Operating	Mining
Millennium Mine	294,000	1967	Operating	Mining
North Steepbank Extension	180,000	2012	Operating	Mining
Steepbank Debottleneck Phase 1	8,000	2010	Operating	Mining

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Fort Hills				
Suncor expects to present development plans to the board of directors for a sanctioning decision in 2013.				
Debottlenneck	27,000	TBD	Approved	Mining
Phase 1	165,000	2016	Approved	Mining
Voyageur South				
Suncor considers Voyageur South to be a longer-term project and has not confirmed a start-up date.				
Phase 1	120,000	TBD	Application	Mining
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora North & South				
Lead partner Canadian Oil Sands says that with turnarounds now complete and no major maintenance planned for the rest of the year, Syncrude is expecting robust production over the remainder of 2012.				
Aurora South Train 1	100,000	2016	Approved	Mining
Aurora South Train 2	100,000	2018	Approved	Mining
Base Mine Extension / Expansion	290,000	2018	Operating	Mining
Stage 3 Expansion	116,300	2036	Operating	Mining
TECK RESOURCES LIMITED				
Frontier				
Teck says it anticipates receiving the final supplemental information requests relating to the Frontier regulatory application in Q3/2012 and responding in Q4.				
Phase 1	75,000	2020	Application	Mining
Phase 2	80,000	2024	Application	Mining
Phase 3	80,000	2027	Application	Mining
Phase 4 Expansion	40,000	2030	Application	Mining
TOTAL E&P CANADA LTD.				
Joslyn North Mine				
Project partner Suncor Energy says development plans will be submitted to the companies' respective boards of directors for a sanctioning decision in 2013.				
Phase 1	100,000	2018	Approved	Mining
NORTH ATHABASCA REGION — IN SITU				
ATHABASCA OIL SANDS CORPORATION				
Birch				
AOS says that $76.3 million was spent on Birch in the first half of the year on its winter drilling and 3-D seismic programs. These both support the filing of its regulatory application, which is anticipated by the end of 2012.				
Phase 1	12,000	TBD	Announced	SAGD
Dover West Carbonates (Leduc)				
AOS says testing of its LASER technology has demonstrated proof of concept. Design basis memorandum engineering for the demonstration project is wrapping up, and engineering design specifications work has begun. Construction has started on a heater assembly facility outside of Strathmore, Alta.				
Phase 1 Demonstration	6,000	2015	Application	TAGD
Phase 2 Demonstration	6,000	TBD	Application	TAGD
Dover West Clastics				
AOS says the first round of supplemental information requests relating to its application have been received and design basis memorandum engineering is progressing.				
Phase 1	12,000	2015	Application	SAGD
Phase 2	35,000	TBD	Announced	SAGD
Phase 3	35,000	TBD	Announced	SAGD
BP P.L.C.				
Terre de Grace				
BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources.				
Pilot	10,000	TBD	Approved	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Birch Mountain				
Canadian Natural says geological scoping is underway.				
Phase 1	60,000	2030	Announced	SAGD
Phase 2	60,000	2031	Announced	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
CENOVUS ENERGY INC.				
Telephone Lake Borealis				
Cenovus has concluded its process to identify a strategic partner for Telephone Lake and has decided to go it alone on the project.				
Phase A	45,000	TBD	Application	SAGD
Phase B	45,000	TBD	Application	SAGD
DOVER OPERATING CORP.				
Dover				
The director of environmental assessment has notified the ERCB that the environmental impact assessment report for the project is complete.				
Dover North Phase 1	50,000	2026	Application	SAGD
Dover North Phase 2	50,000	2028	Application	SAGD
Dover South Phase 2	50,000	2027	Application	SAGD
Dover South Phase 3	50,000	2030	Application	SAGD
Dover South Phase 4	50,000	2027	Application	SAGD
Dover South Phase 5	50,000	2024	Application	SAGD
Mackay River				
ERCB project approval granted January 2012. Dover Ops. says construction is underway.				
Phase 1	35,000	2014	Construction	SAGD
Phase 2	80,000	2017	Approved	SAGD
Phase 3	80,000	2019	Approved	SAGD
Phase 4	35,000	TBD	Approved	SAGD
ET ENERGY LTD.				
Poplar Creek				
The ERCB has released its decision on the 10,000 barrel per day project application. It says ET has not demonstrated the technology is capable of obtaining or sustaining commercial production rates and the application is not approved. The ERCB says ET can reapply based on more performance data, which the company says it has. (The application did not include data from the current test.)				
Experimental Pilot	1,000	2007	Operating	ET-DSP
Phase 1	10,000	TBD	Announced	ET-DSP
Phase 2	40,000	TBD	Announced	ET-DSP
HUSKY ENERGY INC.				
Saleski				
Husky says evaluation work continues, as does design basis memorandum work for the pilot plant and initial field environmental monitoring. These activities will support a regulatory application.				
Carbonate Pilot	TBD	2016	Announced	TBD
Sunrise				
Husky says drilling of its planned 30 SAGD well pairs is now complete. Detailed engineering is also complete, and construction of field facilities has reached 50 per cent completion.				
Phase 1	60,000	2014	Construction	SAGD
Phase 2	50,000	2016	Approved	SAGD
Phase 3	50,000	TBD	Approved	SAGD
Phase 4	50,000	TBD	Approved	SAGD
IVANHOE ENERGY INC.				
Tamarack				
Ivanhoe says it has received and responded to the second round of supplemental information requests regarding its project application from the ERCB. It continues to expect approval in 2012.				
Phase 1	20,000	2013	Application	SAGD
Phase 2	20,000	TBD	Application	SAGD
MARATHON OIL CORPORATION				
Birchwood				
Marathon says that based on results of completed appraisal drilling, a regulatory application will be filed in 2012.				
Demonstration	12,000	2016	Application	SAGD
OAK POINT ENERGY LTD.				
Lewis				
Pilot	5,000	2013	Application	SAGD
SILVERWILLOW ENERGY CORPORATION				
Asabasca				
SilverWillow says for the remainder of 2012 it will focus on analyzing samples and data from this year's drilling program. It will also be conducting an environmental baseline assessment and preparing preliminary engineering design for a pilot SAGD project to enable preparation of a regulatory application, which is expected to be filed in Q2/2013.				
Pilot	12,000	2016	Announced	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
SOUTHERN PACIFIC RESOURCE CORP.				
STP McKay				
Southern Pacific says steaming has begun at the STP McKay project.				
Phase 1	12,000	2012	Operating	SAGD
Phase 1 expansion	6,000	TBD	Application	SAGD
Phase 2A	12,000	2015	Application	SAGD
Phase 2B	6,000	TBD	Application	SAGD
SUNCOR ENERGY INC.				
Firebag				
Suncor says construction of the Stage 4 expansion is 90 per cent complete. Production from Firebag's combined phases is now approaching 300,000 barrels per day.				
Commercial and Expansion	25,000	2003	Operating	SAGD
Stage 1	35,000	2004	Operating	SAGD
Stage 2	35,000	2006	Operating	SAGD
Stage 3	62,500	2011	Operating	SAGD
Stage 3 Debottleneck	25,000	TBD	Application	SAGD
Stage 4	62,500	2014	Construction	SAGD
Stage 5	62,500	2018	Approved	SAGD
Stage 6	62,500	2019	Approved	SAGD
Lewis				
Phase 1	40,000	TBD	Application	SAGD
Phase 2	40,000	TBD	Application	SAGD
MacKay River				
Suncor plans to complete routine planned maintenance at MacKay River over the end of Q3 and the start of Q4/2012.				
MR2	40,000	2016	Application	SAGD
Phase 1	33,000	2002	Operating	SAGD
SUNSHINE OILSANDS LTD.				
Harper				
Sunshine says that steam cycle injection operations at Harper have proved thermally induced oil mobility.				
Carbonate Pilot	1,000	2010	Operating	SAGD
Legend Lake				
Phase 1	10,000	2016	Application	SAGD
Phase 2	10,000	TBD	Assessment	SAGD
Phase 2 Expansion	10,000	TBD	Assessment	SAGD
Phase 3	20,000	TBD	Assessment	SAGD
Phase 3 Expansion	10,000	TBD	Assessment	SAGD
Thickwood				
Sunshine Oilsands has submitted the regulatory application for its Thickwood SAGD project, and is pushing project start-up in 2015.				
Phase 1	10,000	2016	Application	SAGD
Phase 2	20,000	2018	Assessment	SAGD
Phase 2 Expansion	20,000	2021	Assessment	SAGD
West Ells				
Sunshine says that following regulatory approval, its external reservoir engineering firm, GLJ Petroleum Consultants, considers the project to have a high degree of certainty of implementation and that development will proceed.				
A Phase 1	5,000	2013	Construction	SAGD
A Phase 2	5,000	2014	Approved	SAGD
A Phase 3	20,000	2018	Assessment	SAGD
B Phase 1	20,000	2020	Assessment	SAGD
B Phase 2	20,000	TBD	Assessment	SAGD
C Phase 1	30,000	TBD	Assessment	SAGD
SOUTH ATHABASCA REGION — IN SITU				
ALBERTA OILSANDS INC.				
Clearwater West				
Alberta Oilsands says it has responded to a third round of supplemental information requests from the ERCB regarding the project application. The company expects the regulator will hold a public hearing into the project, due in part to its proximity to the Fort McMurray airport.				
Phase 1 Pilot	1,350	TBD	Application	SAGD
Phase 2	25,000	2016	Assessment	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
ATHABASCA OIL CORPORATION				
Hangingstone				
AOS says FEED and procurement are underway, with orders now placed for all major long-lead items needed for plant construction. Approval anticipated later in 2012.				
Phase 1	12,000	2014	Application	SAGD
Phase 2	35,000	2017	Assessment	SAGD
Phase 3	35,000	2019	Assessment	SAGD
BLACKPEARL RESOURCES INC.				
Blackrod				
BlackPearl has submitted its environmental impact assessment report to regulators for the Blackrod commercial project.				
Phase 1	20,000	2016	Application	SAGD
Phase 2	30,000	2018	Application	SAGD
Phase 3	30,000	2021	Application	SAGD
Pilot	900	2011	Operating	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Gregoire Lake				
Canadian Natural says geological scoping is underway.				
Phase 1	40,000	2021	Assessment	TBA
Phase 2	40,000	2025	Assessment	TBA
Grouse				
Regulatory application filed in May. Canadian Natural says it plans to file a regulatory application for an expansion at Grouse in 2012.				
Commercial	10,000	2010	Application	SAGD
Kirby North				
Canadian Natural says construction preparation work is underway for Kirby North Phase 1, including construction of the main access road and site clearing for the plant. The company plans to complete the engineering design specifications for Phase 1 in 2012.				
Phase 1	40,000	2016	Application	SAGD
Phase 2	40,000	2019	Application	SAGD
Kirby South				
Canadian Natural says construction of Phase 1 is 42 per cent complete and remains on cost and on schedule for first steam in 2013. The fourth of seven well pads is being drilled, with wells repeatedly confirming geological expectations.				
Phase 1	40,000	2013	Construction	SAGD
Phase 2	20,000	2020	Application	SAGD
CAVALIER ENERGY INC.				
Hoole				
Cavalier says it will submit the regulatory application for its first 10,000 barrel per day phase at Hoole in Q4/2012.				
Phase 1	10,000	2015	Assessment	SAGD
Phase 2	10,000	TBD	Assessment	SAGD
Phase 3	10,000	TBD	Assessment	SAGD
Phase 4	10,000	TBD	Assessment	SAGD
CENOVUS ENERGY INC.				
Christina Lake				
Cenovus says it has commissioned more than 90 per cent of the Phase D plant and expects first production in Q3. Construction of Phase E is more than 50 per cent complete, with initial production expected in Q3/2013. Site preparation continues for Phase F. Phase H capacity has been increased from 40,000 to 50,000 barrels per day due to the addition of a fifth steam generator that will incorporate Once-Through Steam Generator technology.				
Phase 1A	10,000	2002	Operating	SAGD
Phase 1B	8,000	2006	Operating	SAGD
Phase 1C	40,000	2011	Operating	SAGD
Phase D	40,000	2012	Construction	SAGD
Phase E	40,000	2013	Construction	SAGD
Phase F	50,000	2016	Approved	SAGD
Phase G	50,000	2017	Approved	SAGD
Phase H	50,000	2019	Approved	SAGD

CURRENT PROJECT	CAPACITY	START UP	REGULATORY STATUS	TECHNOLOGY
Foster Creek				
Cenovus says fabrication and facility construction for Phase F is more than 50 per cent complete. Earthworks and site preparation are also underway for Phase G and design engineering for Phase H. Alberta regulators have issued the final terms of reference for Phase J.				
Phase A	24,000	2001	Operating	SAGD
Phase B Debottlenecked	6,000	2003	Operating	SAGD
Phase C Stage 1	30,000	2005	Operating	SAGD
Phase C Stage 2	20,000	2007	Operating	SAGD
Phase D	30,000	2009	Operating	SAGD
Phase E	30,000	2009	Operating	SAGD
Phase F	40,000	2014	Construction	SAGD
Phase G	40,000	2016	Approved	SAGD
Phase H	40,000	2016	Approved	SAGD
Phase J	50,000	2019	Announced	SAGD
Narrows Lake				
Narrows Lake regulatory approval granted in late May. Sanction by partners Cenovus and ConocoPhillips Canada anticipated later this year.				
Phase 1	45,000	2017	Approved	SAGD
Phase 2	45,000	TBD	Approved	SAGD
Phase 3	60,000	TBD	Approved	SAGD
Pelican Lake Grand Rapids				
While regulators review the commercial application, Cenovus continues development work at its pilot. It is currently installing a third steam generator and anticipates steam injection at its second well pair to start in Q3/2012.				
Phase A	10,000	2012	Application	SAGD
Phase B	60,000	TBD	Application	SAGD
Phase C	60,000	TBD	Application	SAGD
Pilot	6,000	2008	Operating	SAGD
CONNACHER OIL AND GAS LIMITED				
Algar				
Connacher reports that, with its budget constrained for 2012, operational activities include increasing netbacks by reducing operating costs and increasing realized bitumen prices, maintaining production within its announced guidance, de-risking and preparing various short-term projects for bitumen production increases, and improving production with technology innovations, such as SAGD+ at Algar and gas re-injection at Great Divide. The company's strategic review process continues.				
Pod 2	10,000	2010	Operating	SAGD
Great Divide				
Connacher reports that, with its budget constrained for 2012, operational activities include increasing netbacks by reducing operating costs and increasing realized bitumen prices, maintaining production within its announced guidance, de-risking and preparing various short-term projects for bitumen production increases, and improving production with technology innovations, such as SAGD+ at Algar and gas re-injection at Great Divide. The company's strategic review process continues.				
Expansion 1A	12,000	2014	Application	SAGD
Expansion 1B	12,000	2016	Application	SAGD
Pod 1	10,000	2002	Operating	SAGD
CONOCOPHILLIPS CANADA LIMITED				
Surmont				
ConocoPhillips Canada says engineering is 90 per cent complete on its Surmont 2 expansion.				
Phase 1	27,000	2007	Operating	SAGD
Phase 2	109,000	2015	Construction	SAGD
Pilot	1,200	1997	Operating	SAGD
DEVON CANADA CORPORATION				
Jackfish				
Devon says construction of the Jackfish 3 project is now approximately 40 per cent complete.				
Phase 1	35,000	2007	Operating	SAGD
Phase 2	35,000	2011	Operating	SAGD
Phase 3	35,000	2015	Construction	SAGD

CURRENT PROJECT	CAPACITY	START UP	REGULATORY STATUS	TECHNOLOGY
Pike				
Devon filed the regulatory application for all three phases of the Pike project in June. The company says facility construction and SAGD drilling for the first phase will begin in late 2012 or early 2013, pending corporate approvals. The company has also submitted its environmental impact assessment report for the project.				
1A	35,000	2016	Application	SAGD
1B	35,000	2017	Application	SAGD
1C	35,000	2018	Application	SAGD
GRIZZLY OIL SANDS ULC				
Algar Lake				
Road, plant and civil site construction expected to be complete imminently. SAGD well pair drilling and completions scheduled to be complete in Q3, with in-field plant assembly complete in Q4. Commissioning to be complete and steam circulation initiated in Q1/2013.				
Phase 1	5,650	2013	Construction	SAGD
Phase 2	5,650	2014	Approved	SAGD
May River				
Grizzly plans to submit a new regulatory application using its SAGD development model at May River in mid-2013.				
Phase 1	10,000	2013	Announced	SAGD
Subsequent Phases	90,000	TBD	Proposed	SAGD
HARVEST OPERATIONS CORP.				
Black Gold				
Harvest expects approval for its 20,000 barrel per day Phase 2 at Black Gold this year.				
Phase 1	10,000	2014	Construction	SAGD
Phase 2	20,000	TBD	Application	SAGD
HUSKY ENERGY INC.				
McMullen				
Husky says that during Q2 eight slant wells that were drilled in late 2011 were put on cold production. Drilling operations for 32 further slant wells began in June. At the air injection pilot, the reservoir process is proceeding with production start-up anticipated in Q3.				
Air Injection Pilot Experimental	750	2012	Construction	SAGD
JAPAN CANADA OIL SANDS LIMITED				
Hangingstone				
The directors of environmental assessments has notified the EUB that the environmental impact assessment for the expansion project is complete.				
Expansion	35,000	2016	Application	SAGD
Hangingstone Pilot				
Pilot	11,000	1999	Operating	SAGD
KOCH EXPLORATION CANADA CORPORATION				
Muskwa				
Koch's Canadian subsidiaries are seeking a strategic investor to advance development and monetize certain oilsands interests, including the Muskwa asset.				
Pilot	10,000	2015	Application	SAGD
LAURICIA ENERGY LTD.				
Germain				
Luricina says detailed engineering is 80 per cent complete. Procurement of long lead items is complete, piling commenced in January, and modules began being transported to the site in March. The company has applied to add a fourth once through steam generator and associated equipment due to anticipated reservoir behaviour.				
Phase 1 Commercial Demonstration	5,000	2013	Construction	SAGD
Phase 2	30,000	2016	Application	SAGD
Phase 3	60,000	TBD	Application	SAGD
Phase 4	60,000	TBD	Application	SAGD
Saleski				
Luricina says testing on its latest well pair at Saleski has resulted in greatest bitumen production achieved to date at 1,500 barrels per day. The company says it is now in the final stages of proving commerciality of SAGD in bitumen carbonates.				
Experimental Pilot	1,800	2011	Operating	SAGD
Phase 1	10,700	2014	Application	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
MEG ENERGY CORPORATION				
Christina Lake				
As of June 2012, MEG says detailed engineering on the Phase 2B expansion is 99 per cent complete, and over 100 of 140 modules have been installed, with the remainder expected to be complete in 2012. All materials have been ordered, with delivery and on-site construction expected to be complete in 2013. Approximately 60 per cent of the horizontal wells for the 42 SAGD well pairs have been drilled.				
Phase 1/Pilot	3,000	2008	Operating	SAGD
Phase 2A	22,000	2009	Operating	SAGD
Phase 2B	35,000	2011	Construction	SAGD
Phase 3A	50,000	2016	Approved	SAGD
Phase 3B	50,000	2018	Approved	SAGD
Phase 3C	50,000	2020	Approved	SAGD
Surmont				
The final terms of reference for the environmental impact assessment report for the Surmont project have been issued by Alberta Environment.				
Phase 1	60,000	2018	Announced	SAGD
Phase 2	60,000	TBD	Announced	SAGD
N-SOLV CORPORATION				
Dover				
Reports are that first results from a $60 million N-Solv field test are expected in spring 2013.				
Demonstration Plant	500	2012	Approved	N-SOLV
NEXEN INC.				
Long Lake				
Nexen says it has achieved first production from Pad 12 at Long Lake and began steaming Pad 13 ahead of expectations. The company says a major turnaround commencing in mid-August will result in lower Q3 production.				
Long Lake South (Kinosis) Phase 1	80,000	TBD	Approved	SAGD
Long Lake South (Kinosis) Phase 2	80,000	TBD	Approved	SAGD
Phase 1	72,000	2008	Operating	SAGD
Phase 2	72,000	TBD	Approved	SAGD
Phase 3	72,000	TBD	Application	SAGD
Phase 4	72,000	TBD	Announced	SAGD
STATOIL				
Kai Kos Dehseh				
Statoil says its next projects will be an expansion to Leismer and the Corner project. Corner will be sanctioned late in 2012 or early in 2013.				
Corner	40,000	2016	Approved	SAGD
Corner Expansion	40,000	TBD	Application	SAGD
Hangingstone	20,000	TBD	Application	SAGD
Leismer Commercial	10,000	TBD	Approved	SAGD
Leismer Demonstration	10,000	2010	Operating	SAGD
Leismer Expansion	20,000	TBD	Approved	SAGD
Leismer Northwest	20,000	TBD	Application	SAGD
Leismer South	20,000	TBD	Application	SAGD
Thornbury	40,000	TBD	Application	SAGD
Thornbury Expansion	20,000	TBD	Application	SAGD
SUNCOR ENERGY INC.				
Chard				
Phase 1	40,000	TBD	Announced	SAGD
Meadow Creek				
Phase 1	40,000	TBD	Approved	SAGD
Phase 2	40,000	TBD	Approved	SAGD
VALUE CREATION INC.				
Advanced TriStar				
Value Creation says it is preparing the regulatory application for the Advanced TriStar project.				
AFS 1	15,000	2016	Announced	SAGD
AFS 2	80,000	2019	Announced	SAGD
AFS 3	80,000	2022	Announced	SAGD
TriStar				
Value Creation is providing the ERCB with additional information supporting its application.				
Pilot	1,000	2014	Application	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
COLD LAKE REGION — IN SITU				
BIRCHWOOD RESOURCES INC.				
Sage				
Birchwood has released its public disclosure document and has held an open house with area residents, some of whom were concerned by the development.				
Pilot	5,000	2015	Announced	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Primrose/Wolf Lake				
Canadian Natural says it's near-term priorities at Primrose include maximizing steam plant utilization by adding pads, a future facility debottleneck/expansion, assessment of a potential Grand Rapids formation expansion, and optimization of steaming techniques to improve on the 15 per cent recovery factor. Two pilots will be conducted in 2012.				
Primrose East	32,000	2008	Operating	CSS
Primrose North	30,000	2006	Operating	CSS
Primrose South	45,000	1985	Operating	CSS
Wolf Lake	12,000	1985	Operating	CSS
HUSKY ENERGY INC.				
Caribou				
Demonstration	10,000	TBD	Approved	SAGD
Tucker				
Phase 1	30,000	2006	Operating	SAGD
IMPERIAL OIL LIMITED				
Cold Lake				
Imperial says that the Nabiye expansion was 77 per cent complete at the end of Q3.				
Phase 1 10	110,000	1985	Operating	CSS
Phase 11 31	105,000	2007	Operating	CSS
Phase 11 16	40,000	2014	Construction	CSS
KOCH EXPLORATION CANADA CORPORATION				
Gemini				
Koch's Canadian subsidiaries are seeking a strategic investor to advance development and monetize certain oilsands interests including the Cold Lake (Gemini) asset.				
Phase 1	3,500	TBD	Approved	SAGD
Phase 2	10,000	TBD	Approved	SAGD
OSUM OIL SANDS CORP.				
Taiga				
OSUM says that Cold Lake First Nations has withdrawn its objection to the Taiga project. It was the only official intervener in the project's regulatory hearing. Pending regulatory approval, OSUM says it will go ahead with development.				
Phase 1	12,000	2016	Application	SAGD
Phase 2	12,000	2017	Application	SAGD
PENGROWTH CORPORATION				
Lindbergh				
Pengrowth achieved first steam at the Lindbergh pilot in February. The company says the reservoir is responding to steam injection, and production performance so far indicates good oil mobility, straight forward heating and minimal solids production, all of which are encouraging at this early stage. Full SAGD operations are expected in Q2.				
Phase 1 Commercial	12,500	2014	Application	SAGD
Phase 2 Commercial	12,500	2016	Announced	SAGD
Pilot	1,300	2012	Operating	SAGD
ROYAL DUTCH SHELL PLC				
Orion				
Phase 1	10,000	2007	Operating	SAGD
Phase 2	10,000	TBD	Approved	SAGD
PEACE RIVER REGION — IN SITU				
ANDORA ENERGY CORPORATION				
Sawn Lake				
Andora Energy majority owner Parchment Energy Corp. anticipates activities related to the Sawn Lake asset to come into focus over the remainder of 2012 with a clear course of action to be communicated shortly after the sale of assets in Thailand, which occurred in mid-June.				
SAGD Demonstration	1,400	TBD	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
NORTHERN ALBERTA OIL LTD.				
Sawn Lake				
Company owner Deep Well Oil & Gas says DeGolyer & MacNaughton Canada has completed its reservoir modelling for a proposed horizontal cyclic steam stimulation pilot at Sawn Lake, concluding the project would yield commercial viable extraction. Deep Well is currently preparing a pilot plan and options for capitalization.				
CSS Pilot	700	TBD	Approved	CSS
PETROBANK ENERGY AND RESOURCES LTD.				
Dawson				
Petrobank says it is awaiting regulatory approval to initiate cold production on it's two well demonstration project to condition the reservoir prior to THAI operations.				
Experimental THAI Demonstration	TBD	2013	Construction	THAI
Phase 2	10,000	TBD	Announced	THAI
ROYAL DUTCH SHELL PLC				
Peace River				
Alberta's environmental assessment director has deemed complete Shell Canada's environmental impact assessment report for the Carmon Creek expansion.				
Cadotte Lake	12,500	1986	Operating	CSS
Carmon Creek - Phase 1	40,000	2015	Application	CSS
Carmon Creek - Phase 2	40,000	2018	Application	CSS
SOUTHERN PACIFIC RESOURCE CORP.				
Red Earth				
Southern Pacific is analyzing results from its latest CSS test at Red Earth. The company says it will finalize future development plans by the end of Q2.				
Commercial	10,000	TBD	Announced	CSS
Pilot	1,000	2009	Operating	CSS
Pilot Expansion	3,000	TBD	Announced	CSS
SASKATCHEWAN REGION — IN SITU				
OILSANDS QUEST INC.				
Axe Lake				
Oilsands Quest says that some of the bids received to acquire, restructure or recapitalize its business could, if subject to further negotiation, be capable of being brought before the court for approval. The company and its court-appointed monitor, Ernst & Young Inc., have agreed that the best interests of Oilsands Quest and its stakeholders will be best served if Ernst & Young takes over operational responsibilities including completion of a transaction.				
Commercial	10,000	TBD	On Hold	SAGD
Reservoir Test	600	2008	On Hold	SAGD
SAGD Pilot	TBD	TBD	On Hold	SAGD
NORTH ATHABASCA REGION — UPGRADER				
BP P.L.C.				
Terre de Grace				
BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources.				
Pilot	8,400	TBD	Approved	Upgrader
CANADIAN NATURAL RESOURCES LIMITED				
Horizon				
Canadian Natural says the addition of a third ore preparation plant, commissioned in Q3/2012, is making a significant difference in improving uptime. It's Phase 2A coker expansion is tracking to its revised schedule, lump sum contracts have been awarded for key pieces of the Phase 2B expansion, and engineering is on track for Phase 3.				
Phase 1	114,000	2009	Operating	Upgrader
Phase 2A	30,000	2014	Approved	Upgrader
Phase 2B	45,000	TBD	Approved	Upgrader
Phase 3	80,000	TBD	Approved	Upgrader
Tranche 2	5,000	2012	Operating	Upgrader
IVANHOE ENERGY INC.				
Tamarack				
Ivanhoe says it has received and responded to the second round of supplemental information requests regarding its project application from the ERCB. It continues to expect approval in 2012.				
Phase 1	34,784	2014	Application	Upgrader
SUNCOR ENERGY INC.				
Base Operations				
Suncor says it has its tailings reduction operations (TRO) infrastructure project and commenced operations. It is also in the process of starting up the hydrotreating unit and hydrogen plant of the new Millennium Naphtha Unit, which is expected to stabilize secondary upgrading capacity and provide flexibility during maintenance activities for secondary upgrading units in the future.				
Millennium Coker Unit	97,000	2008	Operating	Upgrader
Millennium Vacuum Unit	75,000	2005	Operating	Upgrader
U1 and U3	225,000	1967	Operating	Upgrader

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Fort Hills				
Suncor expects to present development plans to the board of directors for a sanctioning decision in 2013.				
Phase 1	145,000	TBD	On Hold	Upgrader
Phase 2 & 3	145,000	TBD	On Hold	Upgrader
Voyageur Upgrader 3				
Suncor says that current work is on validating project scope, developing the project execution plan, engineering and progressing site preparation. The company and its partner plan to submit development plans to their respective boards of directors for sanction in 2013.				
Phase 1	127,000	2016	Approved	Upgrader
Phase 2	63,000	TBD	Approved	Upgrader
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora North & South				
Lead partner Canadian Oil Sands says that with turnarounds now complete and no major maintenance planned for the rest of the year, Syncrude is expecting robust production over the remainder of 2012.				
Base Plant Stage 1 & 2 Debottleneck	250,000	1978	Operating	Upgrader
Stage 3 Debottleneck	75,000	TBD	Announced	Upgrader
Stage 3 Expansion (Lil. T)	100,000	2006	Operating	Upgrader
SOUTH ATHABASCA REGION — UPGRADER				
NEXEN INC.				
Long Lake				
Nexen says it has achieved first production from Pad 12 at Long Lake and began steaming Pad 13 ahead of expectations. The company says a major turnaround commencing in mid-August will result in lower Q3 production.				
Phase 1	58,500	2008	Operating	Upgrader
Phase 2	58,500	TBD	Approved	Upgrader
Phase 3	58,500	TBD	Application	Upgrader
Phase 4	58,500	TBD	Announced	Upgrader
VALUE CREATION INC.				
Advanced TriStar				
Value Creation says it is preparing the regulatory application for the Advanced TriStar project.				
AFS 1	12,750	2016	Announced	Upgrader
AFS 2	25,500	2019	Announced	Upgrader
AFS 3	25,500	TBD	Announced	Upgrader
TriStar				
Value Creation is providing the ERCB with additional information supporting it's application.				
Pilot	840	2014	Application	Upgrader
INDUSTRIAL HEARTLAND REGION — UPGRADER				
NORTH WEST UPGRADING INC.				
Redwater Upgrader				
Project partners North West Upgrading and Canadian Natural Resources say a sanction decision is expected in Q3/2012.				
Phase 1	77,000	TBD	Approved	Upgrader
Phase 2	77,000	2018	Approved	Upgrader
Phase 3	77,000	TBD	Approved	Upgrader
SHELL ALBIAN SANDS				
Scotford Upgrader 1				
Summer 2012 marks the 10th anniversary of the opening of the Athabasca Oil Sands Project.				
Commercial	158,000	2003	Operating	Upgrader
Expansion	90,000	2011	Operating	Upgrader
VALUE CREATION INC.				
Heartland				
Construction was suspended in September 2008.				
Phase 1	46,300	TBD	On Hold	Upgrader
Phase 2	46,300	TBD	Approved	Upgrader
Phase 3	46,300	TBD	Approved	Upgrader

Glossary of oil sands terms

API

An American Petroleum Institute measure of liquid gravity. Water is 10 degrees API, and a typical light crude is from 35 to 40. Bitumen is 7.5 to 8.5.

Barrel

The traditional measurement for crude oil volumes. One barrel equals 42 U.S. gallons (159 litres). There are 6.29 barrels in one cubic metre of oil.

Bitumen

Naturally occurring, viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, it is not recoverable at a commercial rate through a well because it is too thick to flow. Bitumen typically makes up about 10 per cent by weight of oil sand, but saturation varies.

Condensate

Mixture of extremely light hydrocarbons recoverable from gas reservoirs. Condensate is also referred to as a natural gas liquid, and is used as a diluent to reduce bitumen viscosity for pipeline transportation.

Cyclic steam stimulation (CSS)

For several weeks, high-pressure steam is injected into the formation to soften the oil sand before being pumped to the surface for separation. The pressure created in the underground environment causes formation cracks that help move the bitumen to producing wells. After a portion of the reservoir has been saturated, the steam is turned off and the reservoir is allowed to soak for several weeks. Then the production phase brings the bitumen to the surface.

Density

The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre (kg/m^3) or degrees on the American Petroleum Institute (API) gravity scale, in western Canada, oil up to 900 kg/m^3 is considered light- to medium-crude—oil above this density is deemed as heavy oil or bitumen.

Diluent

See Condensate.

Established recoverable reserves

Reserves recoverable under current technology, and present and anticipated economic conditions, plus that portion of recoverable reserves that is interpreted to exist, based on geological, geophysical or similar information, with reasonable certainty.

Established reserves

Reserves recoverable with current technology, and present and anticipated economic conditions, specifically proved by drilling, testing or production, plus the portion of contiguous recoverable reserves that are interpreted to exist from geological, geophysical or similar information with reasonable certainty.

Extraction

A process, unique to the oil sands industry, which separates the bitumen from the oil sand using hot water, steam and caustic soda.

Froth treatment

The means to recover bitumen from the mixture of water, bitumen and solids "froth" produced in hot water extraction (or mining-based recovery).

Gasification

A process to partially oxidize any hydrocarbon, typically heavy residues, to a mixture of hydrogen and carbon monoxide. Can be used to produce hydrogen and various energy by-products.

Greenhouse gases

Gases commonly believed to be connected to climate change and global warming. CO_2 is the most common, but greenhouse gases also include other light hydrocarbons (such as methane) and nitrous oxide.

Initial established reserves

Established reserves prior to the deduction of any production.

Initial volume in place

The volume calculated or interpreted to exist in a reservoir before any volume has been produced.

In situ

Latin for "in place." In situ recovery refers to various methods used to recover deeply buried bitumen deposits.

In situ combustion

A displacement enhanced oil recovery method. It works by generating combustion gases (primarily CO and CO_2) downhole, which then "pushes" the oil towards the recovery well.

Lease

A legal document from the province of Alberta giving an operator the right to extract bitumen from the oil sand existing within the specified lease area. The land must be reclaimed and returned to the Crown at the end of operations.

Muskeg

A water-soaked layer of decaying plant material, one to three metres thick, found on top of the overburden.

Oil sands

...ixture of sand, water, soaked sand, located in four geographic regions of Alberta: Athabasca, Wabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total deposits of bitumen in Alberta are estimated at 1.7 trillion–2.5 trillion barrels.

Overburden

A layer of sand, gravel and shale between the surface and the underlying oil sand. Must be removed before oil sands can be mined. Overburden underlies muskeg in many places.

Pilot plant

Small model plant for testing processes under actual production conditions.

Proven recoverable reserves

Reserves that have been proven through production or testing to be recoverable with existing technology and under present economic conditions.

Reclamation

Returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the province of Alberta at the end of operations.

Remaining established reserves

Initial reserves less cumulative production.

Royalty

The Crown's share of production or revenue. About three-quarters of Canadian crude oil is produced from lands, including the oil sands, on which the Crown holds mineral rights. The lease or permit between the developer and the Crown sets out the arrangements for sharing the risks and rewards.

Steam assisted gravity drainage (SAGD)

An in situ production process using two closely spaced horizontal wells, one for steam injection and the other for production of the bitumen/water emulsion.

Synthetic crude oil (SCO)

A manufactured crude oil composed of naphtha, distillate and gas oil-boiling range material. Can range from high-quality, light sweet bottomless crude to heavy, sour blends.

Tailings

A combination of water, sand, silt and fine clay particles that are a by-product of removing the bitumen from the oil sand.

Tailings settling basin

The primary purpose of the tailings settling basin is to serve as a process vessel, allowing time for tailings water to clarify and silt and clay particles to settle, so the water can be reused in extraction. The settling basin also acts as a thickener, preparing mature fine tails for final reclamation.

Thermal recovery

Any process by which heat energy is used to reduce the viscosity of bitumen in situ to facilitate recovery.

Toe-to-heel air injection (THAI)

An in situ combustion method for producing heavy oil and oil sand. In this technique, combustion starts from a vertical well, while the oil is produced from a horizontal well having its toe in close proximity to the vertical air injection well. This production method is a modification of conventional fire flooding techniques in which the flame front from a vertical well pushes the oil to be produced from another vertical well.

Truck-and-shovel mining

Large electric or hydraulic shovels are used to remove the oil sand and load very large trucks. The trucks haul the oil sand to dump pockets where it is conveyed or pipelined to the extraction plant. Trucks and shovels are more economic to operate than the bucket-wheel reclaimers and draglines they have replaced at oil sands mines.

Upgrading

The process of converting heavy oil or bitumen into synthetic crude either through the removal of carbon (coking) or the addition of hydrogen (hydroconversion).

Vapour extraction (VAPEX)

VAPEX is a non-thermal recovery method that involves injecting a gaseous hydrocarbon solvent into the reservoir where it dissolves into the sludge-like oil, which becomes less viscous (or more fluid) before draining into a lower horizontal well and being extracted.

Viscosity

The ability of a liquid to flow. The lower the viscosity, the more easily the liquid will flow.

CONTACTS

Oil Sands Producers

- Alberta Oilsands
- Andora Energy
- Athabasca Oil Sands
- Baytex Energy
- BlackPearl Resources
- Canadian Natural Resources
- Cenovus Energy
- Chevron Canada
- China National Offshore Oil Corporation
- Connacher Oil and Gas
- ConocoPhillips Canada
- Devon Canada
- Dover Operating Corp.
- Enerplus Resources Fund
- E-T Energy
- Grizzly Oil Sands
- Harvest Operations Corp.
- Husky Energy
- Imperial Oil
- Ivanhoe Energy
- Japan Canada Oil Sands
- Koch Exploration Canada
- Korea National Oil Corporation
- Laricina Energy
- Marathon Oil
- MEG Energy
- Nexen
- North West Upgrading
- N-Solv
- Oak Point Energy
- Occidental Petroleum Corporation
- Oilsands Quest
- OSUM Oil Sands
- Pan Orient Energy
- Paramount Resources Ltd.
- Pengrowth Energy Trust
- Petrobank Energy and Resources
- PetroChina
- Shell Canada
- Sinopec
- Southern Pacific Resource Corp.
- Statoil Canada
- Suncor Energy
- Sunshine Oilsands
- Syncrude
- Talisman Energy
- Teck Resources
- Total E&P Canada
- Value Creation Group

Associations/Organizations

- Alberta Building Trades Council
- Alberta Chamber of Resources
- Alberta Chambers of Commerce
- Alberta Energy
- Alberta Enterprise and Advanced Education
- Alberta Innovates
- Alberta Environment and Sustainable Resource Development
- Alberta's Industrial Heartland Association
- Canada's Oil Sands Innovation Alliance
- Canadian Association of Geophysical Contractors
- Canadian Association of Petroleum Producers
- Canadian Heavy Oil Association
- Canadian Oil Sands Network for Research and Development
- Energy Resources Conservation Board
- In Situ Oil Sands Alliance
- Lakeland Industry and Community Association
- Natural Resources Conservation Board
- Oil Sands Developers Group
- Oil Sands Secretariat
- Petroleum Technology Alliance Canada

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